



(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
20.03.2002 Bulletin 2002/12

(51) Int Cl.7: **E05F 1/12, F24C 15/02**

(21) Application number: **95200960.3**

(22) Date of filing: **15.04.1995**

(54) **Removable door hinge with arms shaped to determine a safety gap between them**

Aushängbares Türscharnier mit Armen welche einen Sicherheitsspalt zwischen ihnen aufweist

Charnière de porte décrochable avec des bras formés pour déterminer un écartement de sécurité entre eux

(84) Designated Contracting States:
CH DE ES FR GB IT LI NL PT SE
Designated Extension States:
SI

(43) Date of publication of application:
23.10.1996 Bulletin 1996/43

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Description

[0001] The object of this invention is a hinge specially designed to attach the closing door of ovens, electrical home appliances, kitchen units and the like, consisting of two parts one of which is integral with the unit and the other with the door, it being possible to remove the door together with the relevant part of the hinge from the unit and refit it thereto, there being established for the attachment hinge a particular position which makes possible such removal while maintaining conditions of safety capable of preventing accidents to the user.

[0002] Hinges of this kind are known in engineering and from an operational viewpoint they solve the problem by making possible both the removal of the door from the unit and the refitting thereof to the part integral with the unit, and therefore the restoration of the attachment upon securing the parts of the hinge in a particular setting.

[0003] Such known hinges are comprised of two parts, or arms, one of which is made integral with the fixed part in order to form the hinge for the door, the other being made integral with the removable part so as to make it possible to stop the door in various positions, for example in the closed position backing onto the front part of the oven, in the fully open position for the removal and insertion of objects from/into the said oven, and in a possible third intermediate position.

[0004] As is also known, the two arms of the hinge should, in order to make possible other opening and closing movements, be shaped and spaced in such a way as to facilitate such movements without the likelihood of causing inconvenience to the oven user.

[0005] To such end there exist special official standards for the protection of the user, in particular the latter's fingers so as to ensure that, during removal, insertion and handling of the door, parts of the hand cannot be inserted in the empty spaces of the hinge when it is being operated.

[0006] There are thus known hinges the two arms of which, while being separate, are arranged in such a way as to prevent the formation of voids between one arm and the other, of dimensions such as to make possible the insertion of one or more fingers. Hinges according to the preamble of claim 1 are known from DE-U-90 00 217.

[0007] There is therefore posed the technical problem of providing a removable hinge capable of rendering impossible the occurrence of the aforesaid inconvenience.

[0008] The elimination of such inconvenience is obtained, by a removable door hinge according to the features of claim 1.

[0009] These and other features will become apparent from the following description, given with reference to the attached drawing in which details 1 and 2 indicate respectively the part of the hinge which is attached to the unit, becoming integral therewith, and the moving part of the hinge inserted in the sides of an oven or like

door (not illustrated). The door may be set either in the position of closure of the oven or in the fully open position, in an approximately horizontal arrangement, or in an intermediate position capable of facilitating the discharge of fumes or heat from the oven so as to achieve slow cooling of anything which is placed therein.

[0010] To fixed part 1 is secured a fixed arm 3, bent in the form of an elbow, which is located in socket 4 inserted in front plate 5 of fixed part 1 and a notch with bent end 6a having the function of arresting the free end of arm 3.

[0011] To the other end of arm 3 is hinged, at 7, moving part 2 of the hinge.

[0012] A moving arm 8 is hinged at 9 to moving part 2 of the hinge and is curved in such a way as to make it possible to stop part 2, and therefore the door, either in the fully open position as shown in the figure, by the action of its end hook 10 against fixed roller 11, or in a partly open position by the action of its intermediate projection 12 against such roller 11.

[0013] Moving arm 8 is held constantly pressed against fixed roller 11 by a coil spring 2a housed within the box-shaped body of moving part 2 and maintained under load with the door either open or closed. Such spring is compressed between an appendage 13 of moving arm 8 and a fixed stop 2b integral with part 2. By this means, moving arm 8 is maintained in contact with roller 11 even with the door closed, and this simultaneously brings about the downward movement of moving part 2 in such a way as to maintain in a stable position socket 4 of fixed arm 3 against plate 5 of fixed part 1.

[0014] To be able to remove moving arm 8 and fixed arm 3 (together with the door) from fixed part 1 of the hinge, it is necessary to release socket 4 of arm 3 from the fixed part and to lower moving arm 8 in order to disengage it from fixed roller 11.

[0015] To achieve such double disengagement, provision is made for the use of a lever 14, substantially of "U" shape and hinged at 15 to fixed arm 3.

[0016] Such lever is held straddling fixed arm 3 in the rest position as shown in the figure and has at its free end a crosspiece 16 capable of providing a means of attachment of the said lever to moving arm 8 when manually rotated anticlockwise.

[0017] The attachment of crosspiece 16 to moving arm 8 is achieved by means of a socket or projection 17 located in the lower part (toward fixed arm 3) of moving arm 8.

[0018] The length of lever 14 is such as to hold and lock moving arm 8 in the open door position and counter the action of the spring so that the fixed and moving arms remain rigidly linked to one another. With this relative locking obtained by means of lever 14 it is possible to remove the fixed and moving arms from fixed part 1 of the hinge together with the door.

[0019] As stated in the preamble, the position of the two arms, fixed arm 3 and moving arm 8, is such that

when the hinge is in the open door position there is obtained a gap, marked 18, formed between edge 3a of fixed arm 3, edge 8a of moving arm 8 and edge 2c of moving part 2 of the hinge. Such gap 18 can, according to the invention, be of substantial dimensions so that it would be possible to insert a finger into such gap when lever 14 needs to be operated in order to disengage it from projection 17 and release the two arms, fixed arm 3 and moving arm 8, previously attached to one another, without injury to the user.

[0020] In fact, during the opening movement, edges 3a, 8a and 2c which form such gap 18 remain, despite the relative movement of the various components, sufficiently spaced apart because of the particular shape of such components as previously described, so as not to pose the risk of crushing any fingers inserted in the gap when opening the door.

[0021] It is intended that the method of implementation of the said components forming gap 18 shall be capable of being altered according to requirements, while maintaining gap 18 sufficiently wide when the door is in the open position, thus respecting the above-mentioned requirements to obviate any danger or harm to parts inserted in the said gap. Furthermore, the presence of lever 14 which is to be inserted into hook 17 of moving arm 8 ensures that the parts forming the said gap are held in their appointed positions both when the door is operated under normal conditions and when it is removed from the front of the oven for normal cleaning operations.

Claims

1. A removable door hinge for domestic appliances such as furniture units, ovens or the like formed by
 - a fixed part (1) capable of being attached to the appliance with its longitudinal dimension along a substantially vertical direction,
 - a movable part (2) capable to be attached to the door;

said fixed part (1) and movable part (2) being connected one another by

a fixed arm (3) carrying a first hinge pin (7) around which the movable part (2) rotates from a closing position substantially parallel to the fixed part and in touch with the latter, to an opening position substantially orthogonal to the fixed part and by
a moving arm (8) hinged by a second pin (9) to the said movable part (2);

- a part of the fixed arm (3) that is outer of the fixed part (1) toward the movable part (2) presenting a profile with a part inclined downward

in respect to the vertical direction followed by a further part folded vertically to the end of which said first hinge pin (7) is accommodated and in that the lower edge along the vertical direction of the movable arm (8) presents a concave curved profile up to the said hook (17) so as to form overall a free space therebetween,

- the upper edge of the movable arm in respect of the vertical direction being provided of cavities cooperating with a sliding roller (11) joined to the fixed part (1),
- the lower edge of the movable arm along the vertical direction being provided with a hook-shaped projection (17a) defining a hook opening space (17),
- to such fixed arm (3) there being hinged a lever (14) provided with a crosspiece (16) and able to rotate from a first position substantially lying on the fixed arm to a second position of engagement with said hook-shaped part (17a) of the movable arm (8) to hold it blocked against the action of of a spring (2a) interposed between the movable part (2) and the moving arm (8) and which tends to make it rotate away from fixed arm (3) toward such sliding roller (11),

characterized in that

said hook-protection (17a) is oriented from the fixed part (1) toward the movable part (2), located in proximity of the free end (10) of the movable arm (8) in a position such as it results partially contained into said fixed part (1) when the movable arm is moved to the open position.

2. A removable door hinge as in claim 1 **characterized in that** the hook (17, 17a) located in the lower part of the movable arm (8) is formed with a wide upward curvature in order to determine an inner space accessible to the fingers of a user among said fixed (1) and movable (2) parts and said fixed (3) and movable (8) arms.

Patentansprüche

1. Ein abnehmbares Türscharnier für Haushaltsgeräte wie etwa Möbelstücke, Backrohre oder dergleichen, bestehend aus

- einem feststehenden Teil (1), welches mit seiner Längsseite in einer im wesentlichen vertikalen Richtung an dem Gerät befestigbar ist, und
- einem an der Tür befestigbaren, beweglichen Teil (2),

wobei das feststehende Teil (1) und das bewegliche Teil (2) miteinander verbunden sind durch

einen feststehenden Arm (3), der mit einem ersten Scharnierstift (7) ausgestattet ist, um welchen herum das bewegliche Teil (2) sich von einer im wesentlichen parallel zu dem feststehenden Teil verlaufenden und diesen berührenden, geschlossenen Position in eine im wesentlichen rechtwinkelig zu dem feststehenden Teil verlaufende, geöffnete Position dreht, und einen beweglichen Arm (8), welcher mittels eines zweiten Stifts (9) drehbar an dem beweglichen Teil (2) befestigt ist,

- wobei ein Teil des feststehenden Arms (3), welcher sich über das feststehende Teil (1) hinaus in Richtung zu dem beweglichen Teil (2) hin erstreckt, ein Profil mit einem in Bezug auf die vertikale Richtung nach unten geneigten Teil aufweist, gefolgt von einem weiteren, vertikal nach unten gebogenen Teil, an dessen Ende der erste Scharnierstift (7) angeordnet ist, und wobei die untere Kante entlang der vertikalen Richtung des beweglichen Arms (8) ein zu dem Haken (17) hin konkav gekrümmtes Profil aufweist, so dass dazwischen überall ein Freiraum gebildet wird,
- wobei die obere Kante des beweglichen Arms in Bezug auf die vertikale Richtung mit Eintiefungen versehen ist, die mit einer an dem feststehenden Teil (1) befestigten Gleitrolle (11) zusammenwirken,
- wobei die untere Kante des beweglichen Arms entlang der vertikalen Richtung mit einem hakenförmigen Vorsprung (17a) versehen ist, durch den ein Hakenöffnungsraum (17) gebildet wird,
- wobei an dem feststehenden Arm (3) ein Hebel (14) drehbar befestigt ist, welcher mit einem Querstück (16) versehen ist und von einer ersten, im wesentlichen auf dem feststehenden Arm liegenden Position in eine zweite, mit dem hakenförmigen Vorsprung (17a) des beweglichen Arms (8) in Eingriff stehende Position drehbar ist, so dass letzterer gegenüber der Zugkraft einer zwischen dem beweglichen Teil (2) und dem sich bewegenden Arm (8) angeordneten Feder (2a) blockiert wird, deren Wirkung darin besteht, ihn von dem feststehenden Arm (3) weg in Richtung der Gleitrolle (11) zu drehen,

dadurch gekennzeichnet, dass

der hakenförmige Vorsprung (17a) von dem feststehenden Teil (1) zu dem beweglichen Teil (2) hin ausgerichtet ist und in der Nähe des freien Endes (10) des beweglichen Arms (8) in einer entsprechenden Position angeordnet ist, so dass er zum Teil innerhalb des feststehenden Teils (1) zu liegen kommt, wenn der bewegliche Arm in die geöffnete Position

bewegt wird.

2. Ein abnehmbares Türscharnier gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der im unteren Teil des beweglichen Arms (8) angeordnete Haken (17, 17a) mit einer weiten Aufwärtskrümmung versehen ist, so dass zwischen dem feststehenden Teil (1) und dem beweglichen Teil (2) bzw. dem feststehenden Arm (3) und dem beweglichen Arm (8) ein für die Finger eines Benutzers zugänglicher Zwischenraum gebildet wird.

Revendications

1. Charnière amovible de porte pour appareils domestiques, par exemple des unités de mobilier, des fours ou similaires, formée par

une partie fixe (1) apte à être fixée à l'appareil avec sa dimension longitudinale dans une direction essentiellement verticale,
une partie mobile (2) apte à être fixée à la porte, ladite partie fixe (1) et ladite partie mobile (2) étant reliées l'une à l'autre par

un bras fixe (3) portant une première broche de charnière (7) autour de laquelle la partie mobile (2) tourne entre une position de fermeture essentiellement parallèle à la partie fixe et en contact avec cette dernière et une position d'ouverture essentiellement perpendiculaire à la partie fixe, et par un bras mobile (8) articulé par une deuxième broche (9) sur ladite partie mobile (2),

une partie du bras fixe (3) située à l'extérieur de la partie fixe (1) en direction de la partie mobile (2) présentant un profil avec une partie inclinée vers le bas par rapport à la direction verticale, suivie par une autre partie repliée verticalement et vers l'extrémité de laquelle ladite première broche de charnière (7) est logée, le bord inférieur dans la direction verticale du bras mobile (8) présentant un profil incurvé concave en direction dudit crochet (17) de manière à former globalement un espace libre entre eux, le bord supérieur du bras mobile dans la direction verticale étant doté de cavités coopérant avec un galet coulissant (11) relié à la partie fixe (1),
le bord inférieur du bras mobile dans la direction verticale étant doté d'une saillie (17a) en forme de crochet définissant un espace d'ouverture de crochet (17),
un levier (14) articulé sur ledit bras fixe (3) et doté d'une traverse (16) et apte à tourner depuis une première position située essentielle-

ment sur le bras fixe jusqu'à une deuxième position d'engagement avec ladite partie (17a) en forme de crochet du bras mobile (8) pour le maintenir bloqué en opposition à l'action d'un ressort (2a) intercalé entre la partie mobile (2) et le bras mobile (8) et tendant à faire tourner le bras mobile pour l'éloigner du bras fixe (3) en direction du galet coulissant (11),

caractérisée en ce que

ladite saillie en crochet (17a) est orientée de la partie fixe (1) vers la partie mobile (2) et est située à proximité de l'extrémité libre (10) du bras mobile (8) dans une position telle qu'elle se trouve partiellement contenue à l'intérieur de ladite partie fixe (1) lorsque le bras mobile est déplacé vers la position ouverte.

2. Charnière de porte amovible selon la revendication 1, **caractérisée en ce que** le crochet (17, 17a) situé à la partie inférieure du bras mobile (8) est configuré avec une large courbure vers le haut pour déterminer un espace intérieur accessible aux doigts d'un utilisateur entre ladite partie fixe (1) et ladite partie mobile (2) et entre ledit bras fixe (3) et ledit bras mobile (8).

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